

Restoration of an old Carob Mill.

Old industrial building transformed into a cultural center.

Type of intervention

Restoration Rehabilitation / Renovation

Concerned elements on the intervention project

- 1. Foundations and underground structures
- 2. Vertical structures
- 3. Horizontal structures and vertical connections
- 4. Roof and terraces
- 5. Façade and building envelope
- 6. Finishes and completion elements
- 7. Integrate services
- 8. General strategies for building recovery

Site Lanitis Carob Mill, Vasilissis Street, Limassol, 3042, Cyprus

Objectives Restoration and rehabilitation to accommodate new uses.

Property Private: Lanitis Group of Companies.

Designer Chief Architect: Kristian Christou Architects,
Job Architect: A. J. Brooks, Architect.
Contractor: CYBARCO

Date Project 1998-2000,
Restoration works 2000 – 2002



Background to the intervention

The Lanitis Carob Mill is an important industrial scale building near the old port, comprising of three adjacent, independent halls from 11m to 16m wide, fronted by a unified elevation with symmetrical openings to the road. It covers an area of 3025sqm and was constructed in phases during the period 1860 to 1940. The Carob Mill was strategically sited 200m from the town's old trading port where the all the produce was exported from. It is also in the centre of the first semi-industrial/ industrial zone which started appearing in the area around the port 150 years ago.

It's initial purpose was the processing of Carobs and the storage of the by-products, which was a staple agricultural product of Cyprus and especially in Limassol. During the month of September, when the carobs were ripe, the farmers gathered the carobs and bought them to the Carob Mill they were placed in large heaps in the South hall. The carobs were then passed through the milling machines that are in the central hall. Here their seeds were removed and the shells were milled into a powder of varying coarseness according to the needs of the overseas market, which absorbed all of the produce of the Carob Mill, and then the produce was bagged and stored in the North hall. The carob is an excellent natural sweetener and is therefore used in the baking trade and in child foods. In the past, the high gelatine content in the carob seeds was used in a wide variety of products including glues, gramophone records and photographic and cinema film.

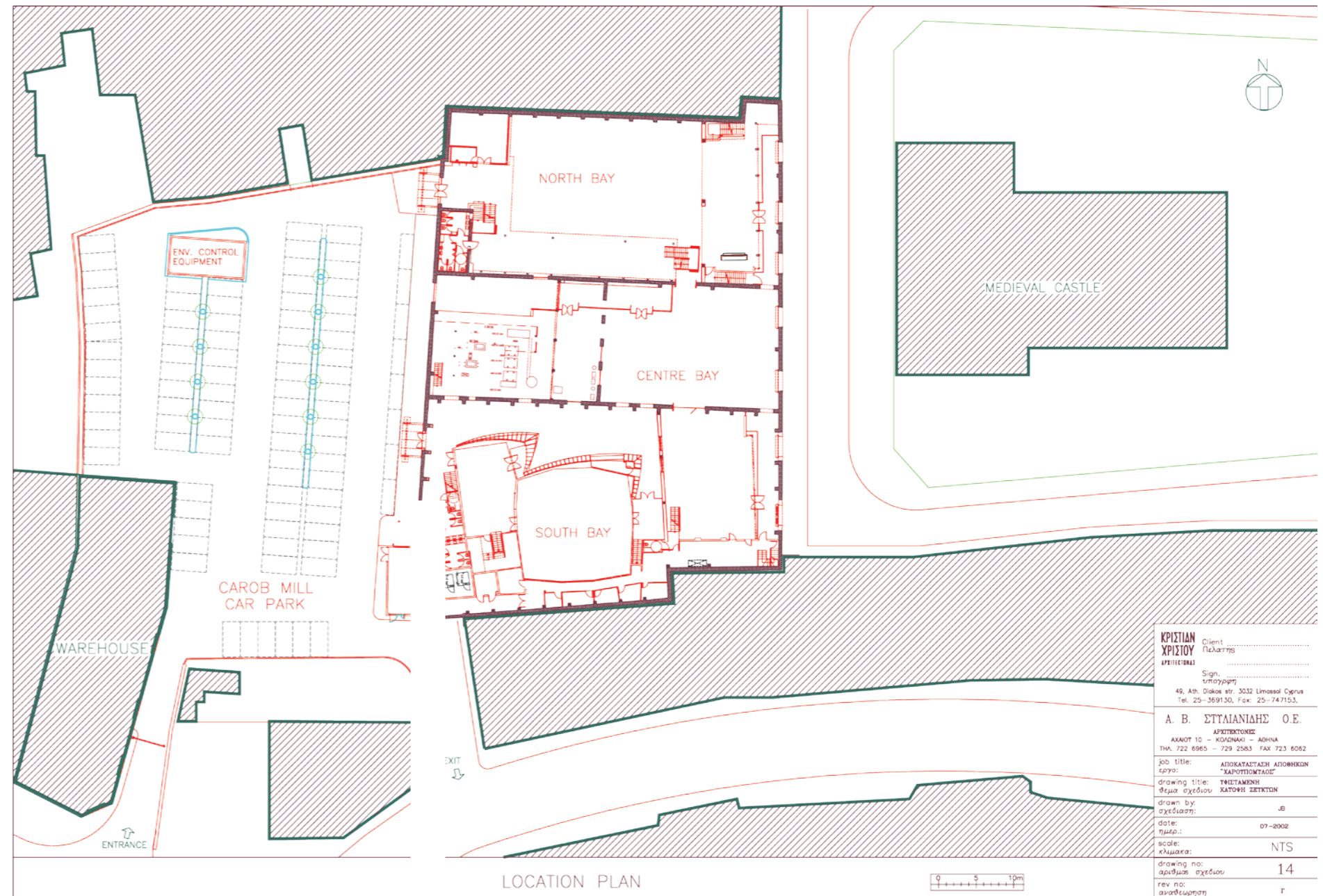


Fig.1: Location plan. © Kristian Christou Architects, A. J. Brooks, Architect.

Description of the building

The Carob Mill was registered as a Listed Building in 1990. It is built with solid, exposed stone walls of 40cm thickness with reinforcing stone buttresses at intervals. The buttresses that were constructed in the later phases are of reinforced concrete, as are the free-standing columns supporting the roof trusses in the north hall. In places there are horizontal reinforced concrete beams in the walls to enable them to withstand the loads imposed by the sacks of produce stacked up against them, to roof height.

The height of the walls is on average 6m. The roofs are of timber trusses with metal strip reinforcing at the joints and the covering was of corrugated asbestos sheets. They are pitched and, in some instances, hipped with raised, timber rooflights and vents in the centre. The East elevation of the building is on the public street-front where there are large openings that allowed the trucks to enter the building. Directly opposite is the Limassol Medieval Castle which dominates all the surrounding area. The street was converted to a pedestrian way during regeneration works of the area in 2010.

The milling machinery is of special interest since it comprises of 4 mechanical mills which were fabricated in the U.K. for this building. The milling machinery covers an area of 500sqm and has a height of 8.5m

The mills were powered by 2 large, single piston, diesel engines, also from the U.K. which transferred movement to the mills through a line-shaft system of axels, pulleys and leather belts, some of which are in recesses under the floor.

The Diagnosis of the building (values and state)

The building was in relatively good condition even though demand for the carob produce had all but died out and the building mill remained unused for the last 30 years before the renovation work started. During this period, it was used to store and sell agricultural fertilizers. The internal height of the roofs with their rooflights and vents were adequate for the industrial use of the building and only some additional electric lighting had been installed. There was no climate control or any mechanical ventilation. There was no sign of damp problems as is usually the case in buildings of this era and the elements of the building ex: walls, roof trusses etc. were structurally intact. However, its new designated use as a Centre for Cultural and Social exchange demanded an upgrade in the safety provided by the structural elements and also an upgrade in the internal environment and functionality provided by the electrical and mechanical services.

Restoration works

Following the owner's wishes, the Carob Mill was required to offer the following functions:

Carob Museum, showcasing the milling machinery and power generators.

Arts Centre in the North hall.

Restaurant and bar in the South hall.

Time Elevator hall, also in the South hall.

Large entry hall/ foyer in the Central hall, for multi-function activities.

Small meeting room in the North hall, on the mezzanine level.

During the design phase it was suggested that the viability of the project would be greatly improved by providing parking space to support the activities in the building. The area is characterized by abutting buildings, along the road-fronts, with no parking facilities in the immediate area. The owners acquired a large empty plot, 3200sqm, abutting the west wall of the building. This was used as dedicated parking for 100 cars, but also for the siting of air-conditioning plant for the building.

An analysis of the new requirements and the initial design strategy lead to the establishment of the following goals:

The large scale of the building and internal height of the halls should remain visible as far as possible. The new accommodation should be served by smaller foyer, with walkways that create and emphasize connectivity with the Medieval Castle to the east, through the building to the parking area on the west side and to the old port and the Limassol Marina.

All the existing wall materials and elements (stone, concrete) should be retained and restored. The new interventions should be constructed so as to be fully removable without affecting the original structure. They should also use a different architectural scale so as to accentuate the materials, shape and colours of the original fabric, the building technology of the era, and the difference in construction methods, old and new.

The industrial character of the building should be respected and retained.

As a result of the above goals, the following interventions were implemented:

The foundations were reinforced with new reinforced concrete

elements wherever deemed necessary.

Reinforcing some of the stone buttresses with metal angles and through bolts.

The timber trusses were treated for insect infestation and then applied with a non-toxic preservative. Some joints and timber members were reinforced with metal strips, in line with the existing reinforcing strips that were placed on the trusses at the time of manufacture.



Fig.2: In the North hall, central, free-standing concrete columns and metal trusses were removed and replaced with single span timber laminated trusses with no intermediate support. © Kristian Christou Architects, A. J. Brooks, Architect.

New internal glazing elements were constructed of a curtain wall system with exposed fixing bolts. In the large openings in the east wall, traditional industrial roller shutters were installed, without the decorative roller covers.

All electrical and mechanical elements are exposed and visible.

The existing fabric was cleaned using water jet, and the bonding was repaired with the traditional bonding material.

All building elements, timber, metal, concrete, were retained, restored and remain visible.

The tall internal height of the halls allowed for the construction of mezzanines, approx 500sqm in total, to accommodate various ancillary functions. These are all removable without affecting the original fabric.

The new interventions have been constructed of lightweight materials, dry-wall for the solid elements and glazing to allow transparency and an appreciation of the continuation of the space.

At the base of all the existing walls, inside and out, a shallow floor recess of approx. 15cm wide was formed and filled with decorative pebbles. This is to maintain separation of the original wall from the new flooring material and also to allow for the dissipation of any damp that may accumulate.



Fig.3: Removal of all asbestos roofing material, in accordance with the regulations. The new roof covering is an insulated, built up metal sheet roof with a noise absorption under-layer and a sound deadening intermediate layer. © Kristian Christou Architects, A. J. Brooks, Architect.



Fig.4: View of the rehabilitated interior, and new mezzanine space. © Kristian Christou Architects, A. J. Brooks, Architect.

The original concrete floors were removed. New services were installed in the sub-floor layer and new reinforced concrete floors were installed. The floor finishes are poured, industrial grade cementitious toppings with decorative small aggregate, in some cases resin-based floor toppings and epoxy finishes were installed. The movement joints in the floors create an abstract, angular pattern, in contrast to the rectangular geometry of the halls, except in the North hall where the rectangular geometry is reflected in the joint layout.

The Mill – Crushing machines

Some interior, enclosing walls around the mill machinery and the engine room were removed to join the two spaces and also

to increase their visibility from other surrounding spaces, thus acquiring a dominant presence through their size and appearance. All the milling machinery is clad with timber.

All the timber elements were treated and protected against damp and insects. The metal elements were either painted to match their original colours or treated with rust converter.



Fig.5: View of the rehabilitated interior with new interventions.
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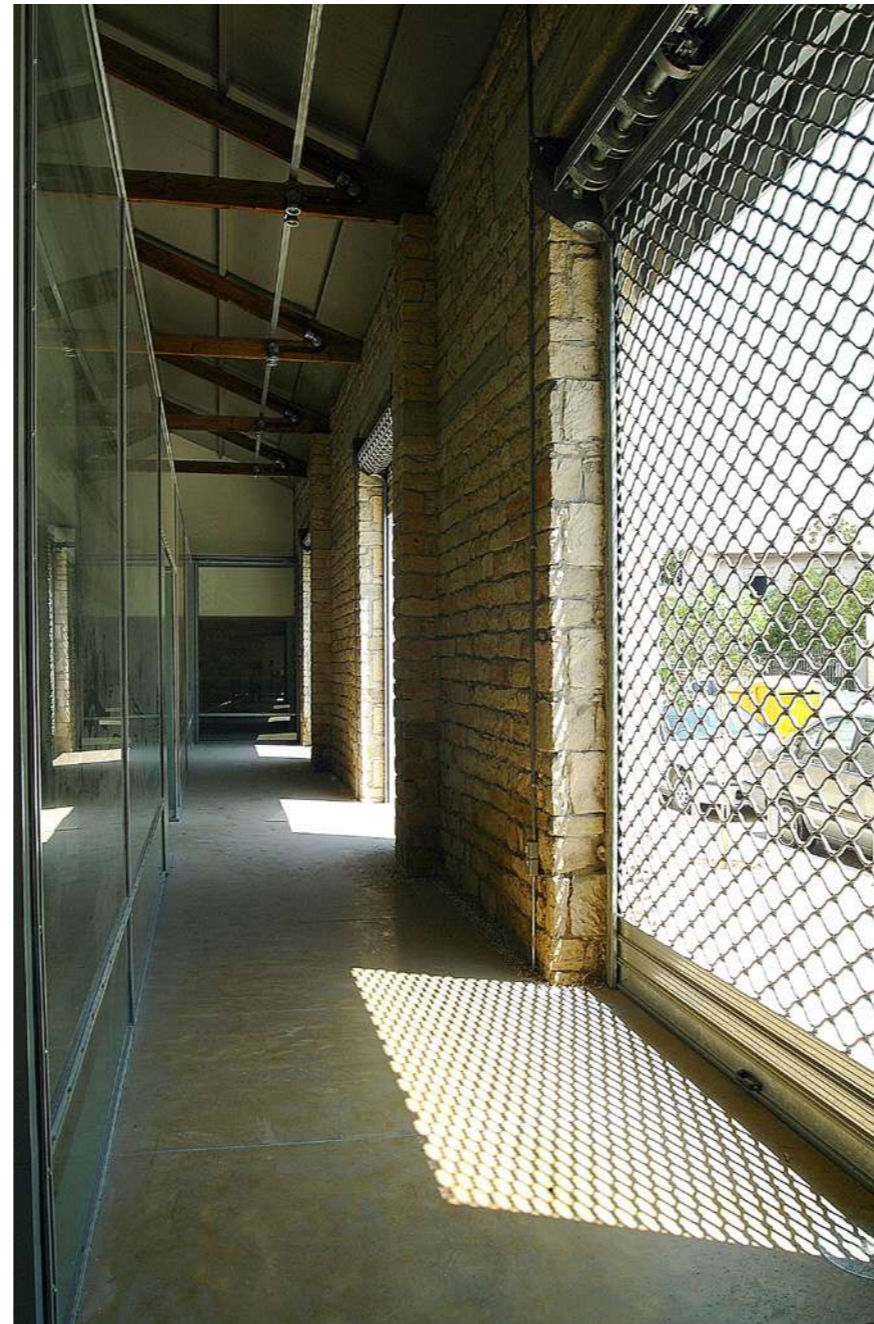


Fig.6: View of the rehabilitated interior with new interventions.
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Fig.7-8: View of the restored machines.
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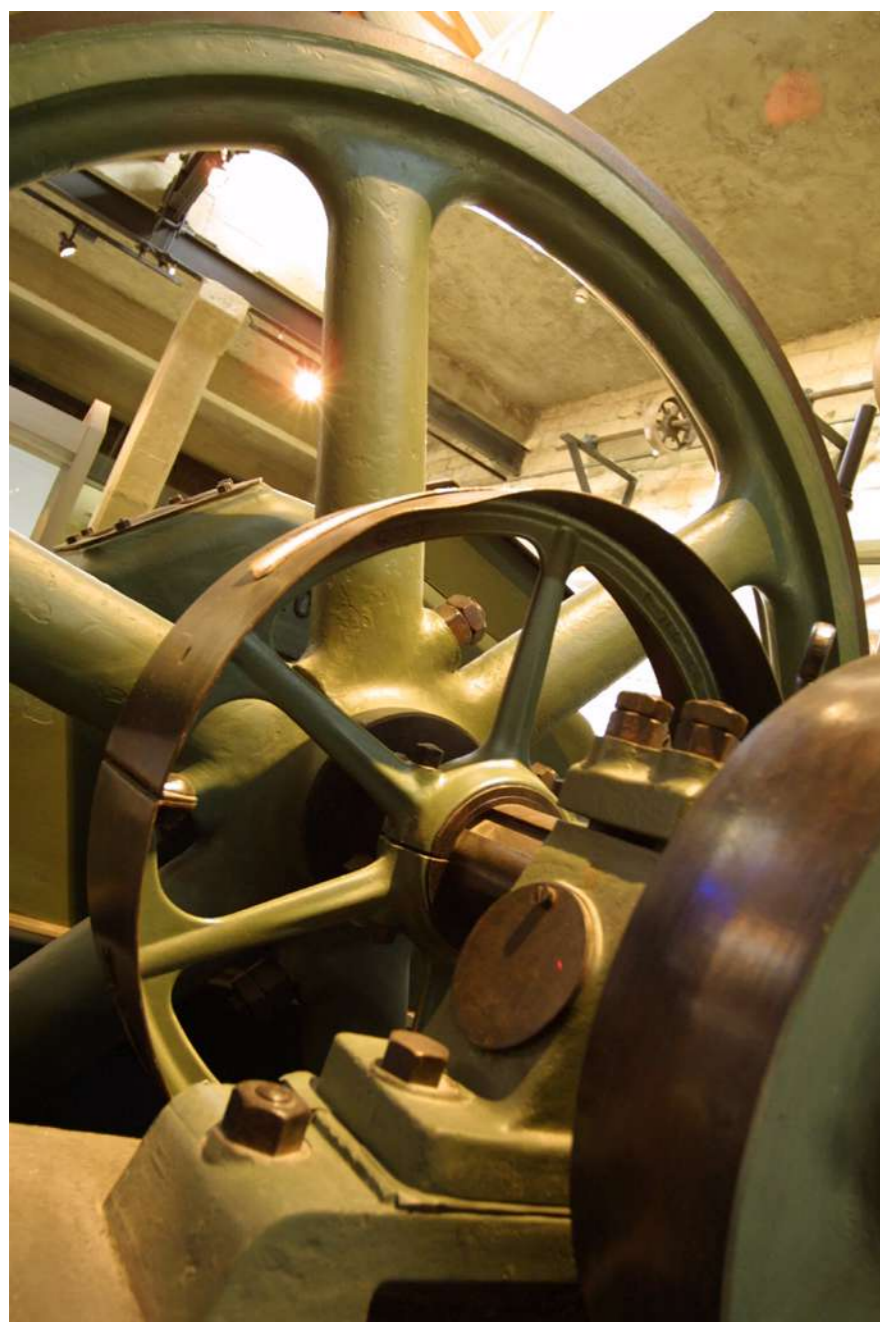


Fig.9: View of the restored machines.
© Kristian Christou Architects, A. J. Brooks, Architect.



Fig.10: View of the restored machines.
© Kristian Christou Architects, A. J. Brooks, Architect.

The diesel engines and other elements of the line-shaft system were treated in the same way.

In the Museum area, graphic and acoustic guides are available that explain the farming and processing of the carob. Other items ex: traditional farm tools, weighing scales, and other associated equipment are also on display, with old photographs of their use.

The original “French” coloured cement floor tiles have been retained and restored where possible.

Heating, cooling, ventilation & lighting.

Heating and cooling is provided by tubular air ducts suspended within the trusses and visible. The main compressors are all housed in an enclosure in the parking area on the west side. Others that serve smaller areas in the mezzanines on the east side are housed on anti-vibration mountings in recesses in the

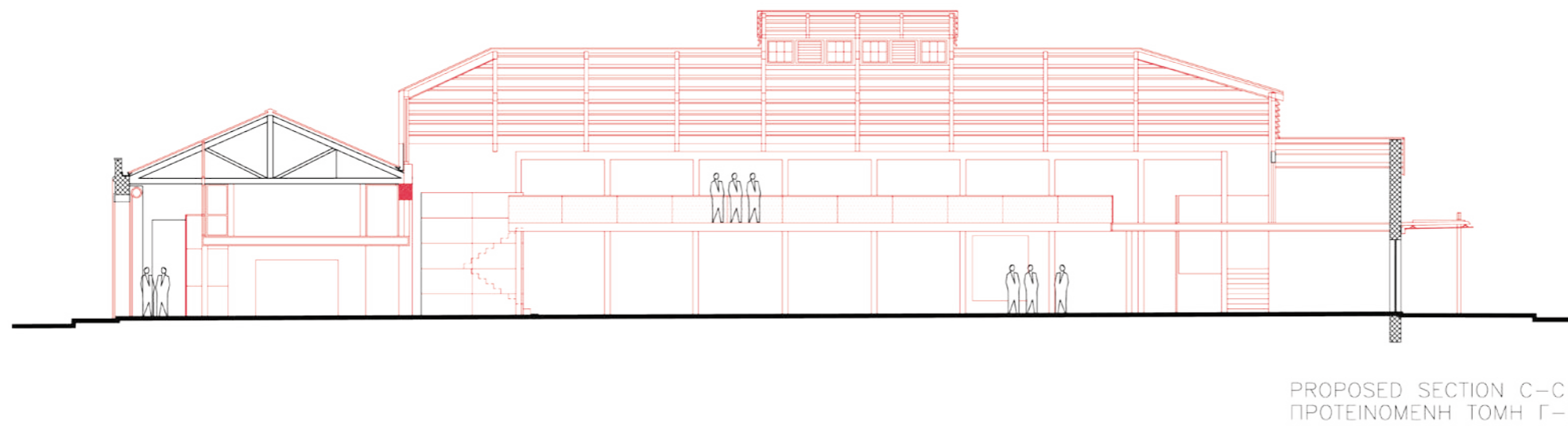
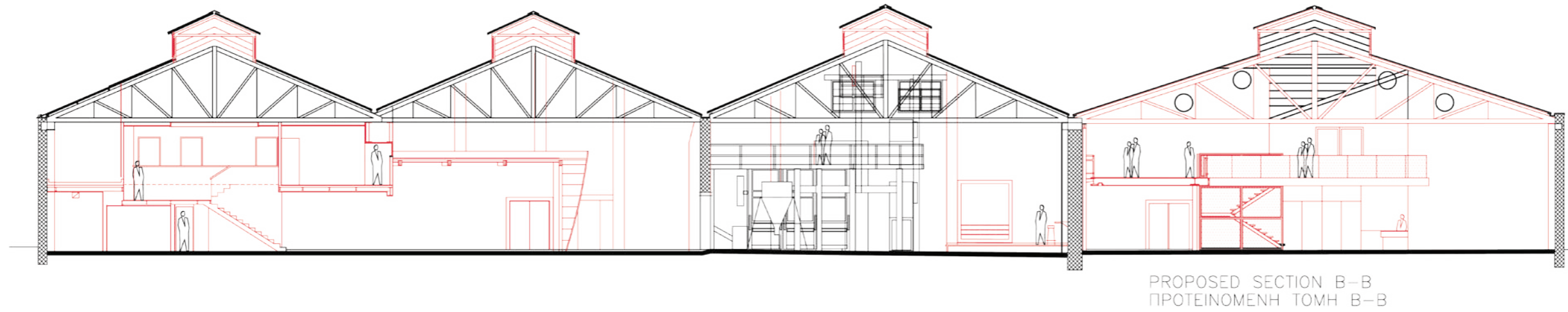
roof space, so as not to protrude over the roof. All spaces and halls are independently controlled so that they can be used separately and independently. The general lighting, local lighting and effects light fittings, speakers, safety systems etc are all located on or within the truss space in the roof. These provide for a wide variety of functions ex: cinema events, art exhibitions, conferences etc.



Fig.11: All air-conditioning ducts and light tracks are exposed in the roof truss zone. © Kristian Christou Architects, A. J. Brooks, Architect.

Accessibility (Design for all)

The floors in all the areas of the building are on roughly the same level, without steps. These floors are slightly higher than the public pavement level and the car park. Here small ramps of 25cm allow for easy access and therefore there was no requirement to provide special access equipment.



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date: ημερ.:	07-2002
scale: κλίμακα:	NTS
drawing no: αριθμός σχεδίου	08
rev no: αναθεώρηση	Γ

Fig.12: Section drawings of the proposed intervention. © Kristian Christou Architects, A. J. Brooks, Architect.

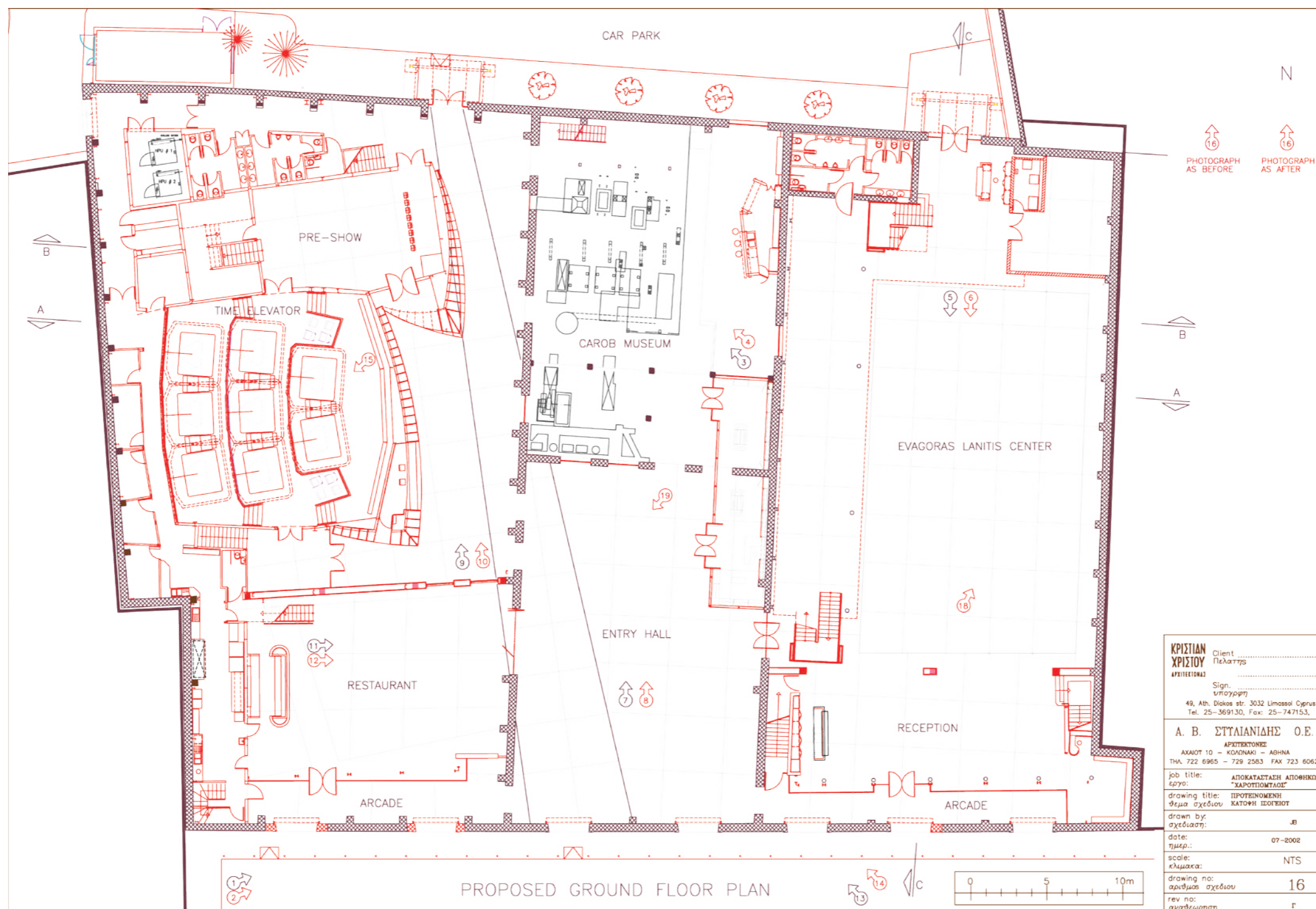


Fig.13: Ground floor plan of the proposed intervention. © Kristian Christou Architects, A. J. Brooks, Architect.

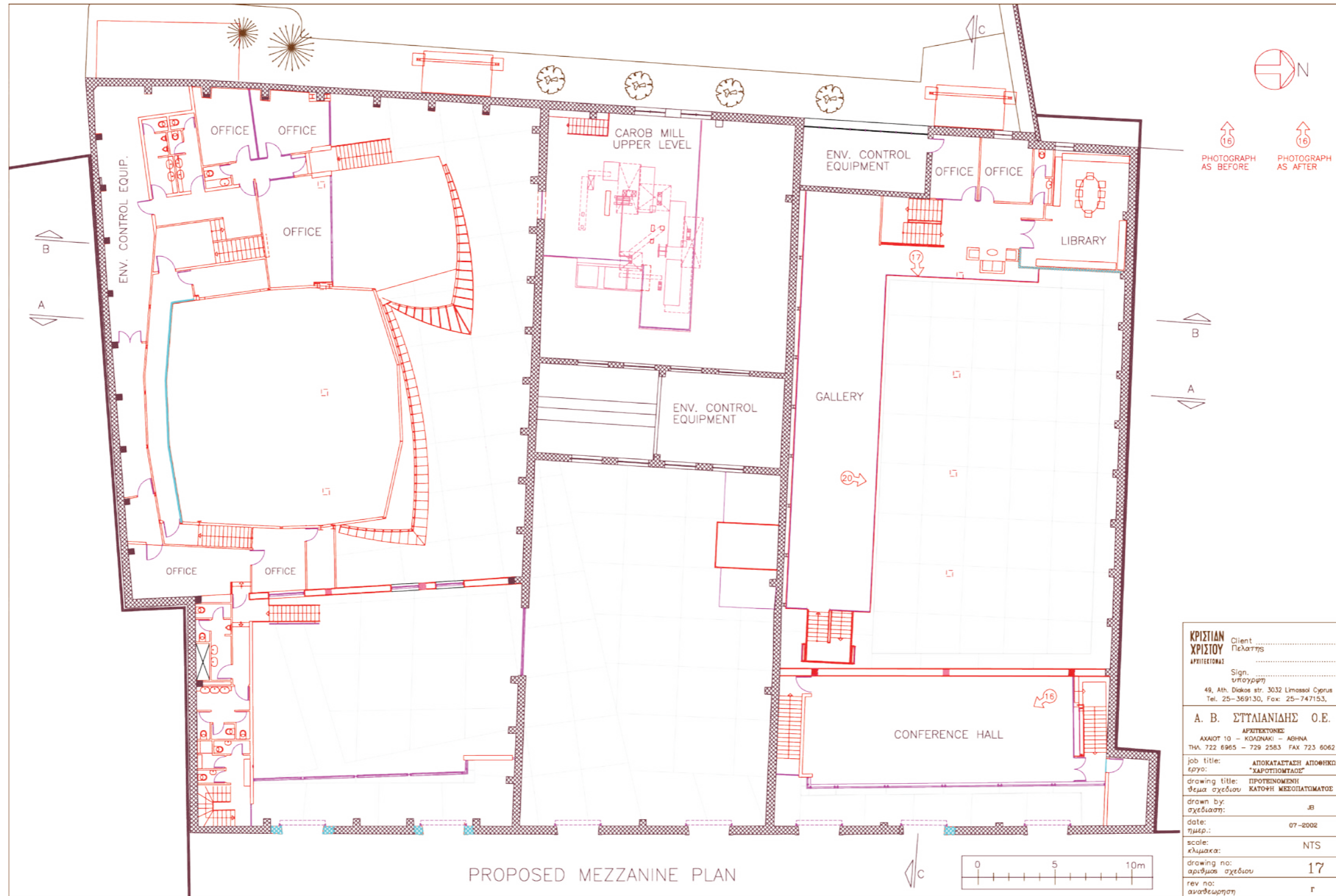


Fig.14: Mezzanine floorplan of the proposed intervention. © Kristian Christou Architects, A. J. Brooks, Architect.



Fig.15-16: Front (East) elevation - before and after. © Kristian Christou Architects, A. J. Brooks, Architect.



Fig.17-18: Public street - before and after. © Kristian Christou Architects, A. J. Brooks, Architect.



Fig.19-20: South hall, East side - before and after. © Kristian Christou Architects, A. J. Brooks, Architect.



Fig.21-22: Central hall, East side - before and after. © Kristian Christou Architects, A. J. Brooks, Architect.

Fig.23-24: Carob Mill - before and after. © Kristian Christou Architects, A. J. Brooks, Architect.

Fig.25-26: Engine room - before and after. © Kristian Christou Architects, A. J. Brooks, Architect.



Fig.27-28: North hall - before and after. © Kristian Christou Architects, A. J. Brooks, Architect.

Fig.29-30: South hall- before and after. © Kristian Christou Architects, A. J. Brooks, Architect.

Fig.31-32: West elevation - before and after. © Kristian Christou Architects, A. J. Brooks, Architect.

Assessment of the results

The Carob Mill is sited in the centre of the old part of Limassol town. It was one of the first buildings in the area to be designated as a Listed Building. Other neighbouring buildings followed thus maintaining the traditional character of a large part of the old town.

The restoration and re-use of the Carob Mill was influential in the implementation of similar interventions in old buildings in the area that were either vacant, used as stores or were of semi-industrial/ industrial use.

In 2010 the Limassol Municipality, with funding from the European Regional Development Fund, embarked on a programme of upgrading the infrastructure in the area which included all aerial service lines being housed underground, repairing and renovating building facades, pedestrianization of roads, etc.



Fig.33: Approach road to Carob Mill before. © Kristian Christou Architects, A. J. Brooks, Architect.



Fig.34: Approach road to Carob Mill after. © Kristian Christou Architects, A. J. Brooks, Architect.



Fig.35: New public square outside the Carob Mill. © Kristian Christou Architects, A. J. Brooks, Architect.



Fig.36: Original condition with traffic access. © Kristian Christou Architects, A. J. Brooks, Architect.



Fig.37: After restoration with traffic access. © Kristian Christou Architects, A. J. Brooks, Architect.

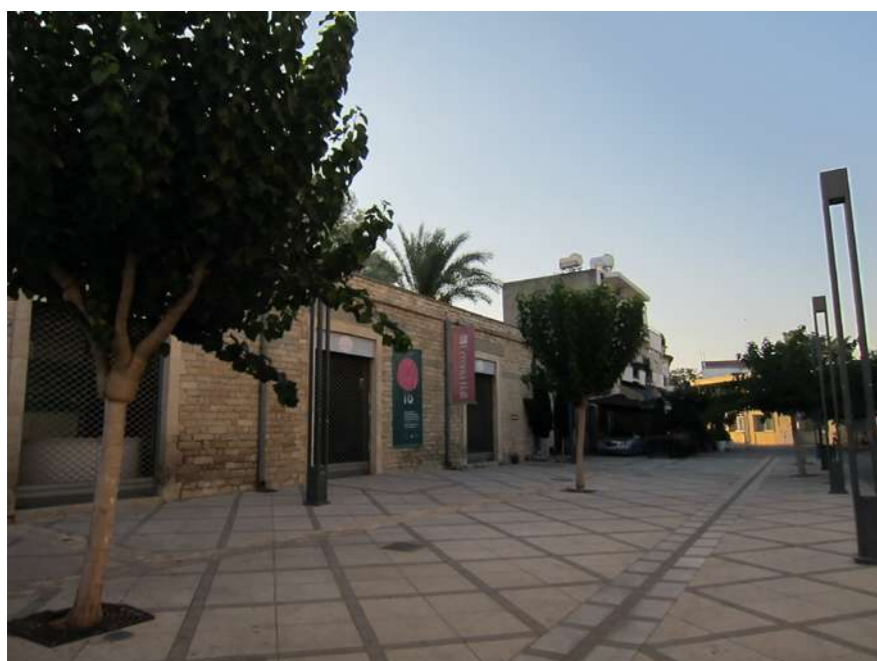


Fig.38: After pedestrianization (present day). © Kristian Christou Architects, A. J. Brooks, Architect.

With the infrastructure upgrade programme and more directly the restoration of the Carob Mill building, this area of the town which before 2000 was run-down and in disrepair, showed a reverse in the negative development and social trends that were. The Carob Mill served as a model example for the utilization of old industrial buildings for modern uses and encouraged other owners and businesses to invest in other developments in the area.

The large size of the Carob Mill building makes it ideal for housing varied and different functions under the same roof, attracting and serving hundreds of people day and night.

As a result of the decision to separate the new interventions from the original fabric of the building, it was possible to totally remove the Time Elevator installation and refurbish the space as an events hall.



Fig.39: Time elevator interior. © Kristian Christou Architects, A. J. Brooks, Architect.

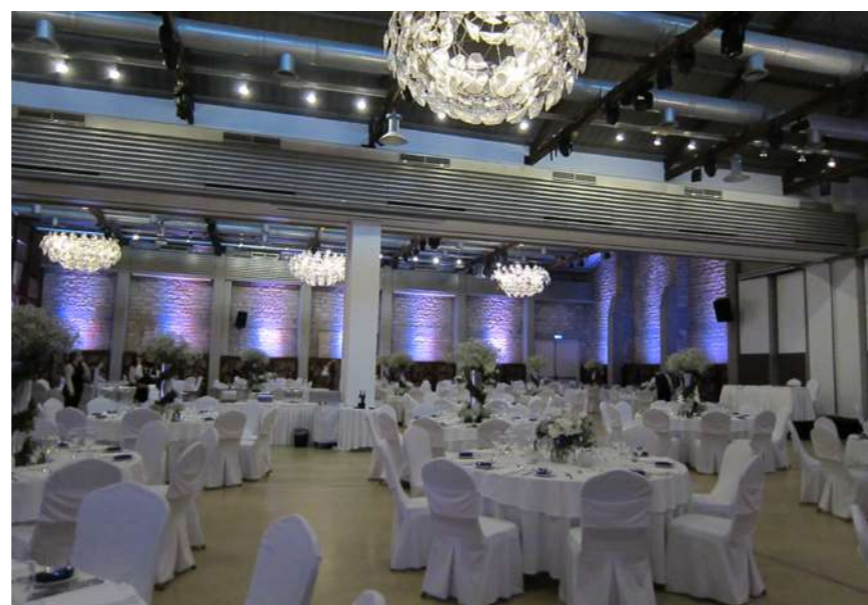


Fig.40: Events hall interior. © Kristian Christou Architects, A. J. Brooks, Architect.

It was instrumental in converting the area into an attractive destination for the youth, tourists and other visitors of all ages. The Carob Mill conference facilities and meeting rooms have

hosted and continue to host some of the most important State organized functions and functions organized by important private business groups. In 2011 the Carob Mill hosted the celebratory meeting for the award of Presidency of the European Union to Cyprus. In the same space, art exhibitions are held, folk festivals are staged, concerts given, etc.



Fig.41-42: The Carob Museum has been included in the educational programme of the Public Schools and children visit from all over Cyprus. © Kristian Christou Architects, A. J. Brooks, Architect.

References

Europa Nostra Cultural Heritage Award, shortlist finalist, 2007 - 2008.

Exhibited at the Benaki Museum, Athens, 2013.

Featured in “Architects and Engineers”, professional magazine, 2004.

Alexis Theodosiades Award, issued by the Association of Architects and Engineers of Cyprus 2004.